

Application No.: 10/646236

Docket No.: NGW-010

REMARKS

Applicants amend claim 1. No new matter is added. Upon entry of this amendment, claims 1-4 are pending, of which claim 1 is independent. Applicants respectfully submit that the pending claims define over the art of record.

The Claimed Invention

The claimed invention provides a fuel cell box to store the fuel cell for protection so that hydrogen or electricity from the fuel cell is not in contact with the outside world. The fuel cell box can also prevent the fuel cell from being deformed by measuring the amount of deformation of the vehicle body sideward of the fuel cell box. If the deformation amount exceeds the predetermined amount, the protection operation of the fuel cell is performed, thereby preventing the fuel cell box being damaged.

The claimed invention further provides a system to protect the fuel cell in the event where there is no large impact to the vehicle but a member of the vehicle body is so deformed that the fuel cell or fuel cell box can be potentially damaged by this deformation. Conventionally, only a large impact will cause an impact detecting sensor to send signals to stop the supply of hydrogen to the fuel cell. However, this does not prevent damage to the fuel cell or the fuel cell box, especially when there is no large impact but there is a large deformation of certain parts of the vehicle. See Background and Summary. The present invention uses accelerations detected by the deformation sensors to calculate the *distance* traveled by the parts of the vehicle body that are in the vicinity of the sensors so that even when impact (acceleration) is small, deformation can still be detected. See page 9 line 3 to page 10 line 9, and See claim 2. A protection device can stop a hydrogen supply to the fuel cell when the deformation is large enough, to avoid damage to the fuel cell or fuel cell box. See page 10 lines 4-9 and page 11 lines 4-11.

Rejections of Claims 1, 2, and 4

Examiner rejects claims 1, 2, and 4 under 35 U.S.C. §103(a) as being unpatentable over United States Patent No. 6,378,637 to Ono et al. (hereafter "Ono") in view of United States Patent No. 6,591,924 to Shimizu et al. (hereafter "Shimizu"). Applicants respectfully submit that the combination of the Ono reference and the Shimizu reference does not teach or suggest a fuel cell

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Application No.: 10/646236

Docket No.: NGW-010

box for storing the fuel cell, a deformation detecting sensor for detecting an amount of a deformation of a vehicle body sideward of the fuel cell box and a protection device for implementing a predetermined protection operation of the fuel cell when the deformation detecting sensor detects a predetermined amount of deformation of the vehicle body, as required by independent claim 1.

The Ono Reference

The Ono reference discloses that a fuel cell is disposed under the floor of a vehicle, however, the Ono reference does not disclose the fuel cell box for storing the fuel cell.

Without characterizing the Examiner's analysis of the Ono reference, the Examiner notes that the Ono reference does not teach or suggest a deformation detecting sensor for *detecting a deformation of a vehicle body sideward of the fuel cell box* and a protection device for implementing a predetermined protecting operation of the fuel cell when the deformation detecting sensor *detects a predetermined amount of deformation of the vehicle body, as required by independent claim 1.* The Examiner hence combines the Ono teachings with the Shimizu reference.

The Shimizu Reference

The Shimizu reference describes a method and system for preventing degradation and damage to a fuel cell when power supply to the accessories for driving the fuel cell is stopped. Applicants respectfully submit that the Shimizu reference does not teach or suggest that an amount of deformation of the vehicle body is measured because the fuel supply is only stopped according to the *magnitude of the shock* at the time of a vehicle collision. See Col. 3, lines 32-38. Therefore, the Shimizu reference merely discloses a typical prior art system that exhibits disadvantages that the claimed invention is trying to solve. See Background of the present application. Therefore, the Shimizu reference does not teach or suggest a deformation detecting sensor for *detecting an amount of a deformation of a vehicle body sideward of the fuel cell box, as required by independent claim 1.*

The Shimizu reference further does not teach or suggest a protection device for implementing a predetermined protecting operation of the fuel cell when the deformation

Application No.: 10/646236

Docket No.: NGW-010

detecting sensor *detects a predetermined amount of deformation* of the vehicle body, as required by independent claim 1, because the Shimizu reference only teaches operations being performed when there is large impact (acceleration) and not deformation. The Shimizu reference also does not teach or suggest a fuel cell box for storing the fuel cell.

Accordingly, the combination of the Ono reference and the Shimizu reference do not teach or suggest a fuel cell box for storing a fuel cell, a deformation detecting sensor for *detecting an amount of a deformation* of a vehicle body *sideward of the fuel cell box* and a protection device for implementing a predetermined protection operation of the fuel cell when the deformation detecting sensor *detects a predetermined amount of deformation* of the vehicle body, as required by independent claim 1. Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 1.

Applicants note that the dependent claims also recite separate patentable subject matter. For example, claim 2 recites the limitation that the accelerations detected by the sensors are used to calculate distance traveled by the vehicle body so that deformation of the vehicle body can be measured. Applicants respectfully submit that the combination of the Ono reference and the Shimizu reference does not teach or suggest this limitation. As such, for this and the reasons set forth above, the dependent claims also define over the art of record.

Rejection of Claim 3

Claim 3 is rejected under 35 U.S.C. §103(a) as being unpatentable over the Ono reference in view of the Shimizu reference and further in view of United States Patent No. 5,934,703 to Mimura et al. (hereafter 'Mimura').

Examiner notes that the combination of the Ono reference and the Shimizu reference do not teach or suggest a stroke sensor provided at a side of the fuel cell box, as required by claim 3. The Examiner cites the Mimura reference to cure the deficiency of the Ono reference and the Shimizu reference.

The Mimura Reference

The Mimura reference teaches a collision sensing apparatus that can detect a collision on

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Application No.: 10/646236

Docket No.: NGW-010

a side door or a center pillar of a vehicle. The Examiner notes that the Mimura reference teaches the equivalent of a stroke sensor. Without characterizing the Examiner's analysis of what a stroke sensor is, dependent claim 3 requires that the stroke sensor is positioned at a *side of the fuel cell box*, and the Mimura reference fails to teach or suggest this limitation. If the stroke sensor is not placed at a side of the fuel cell box, the stroke sensor will not be able to prevent the fuel cell or fuel cell box from being deformed by deformation of the vehicle body sideward of the fuel cell box. As required in claim 1, the fuel cell box is disposed *under* a floor of the vehicle. However, in all of Mimura's examples, the sensor is positioned above the vehicle floor 27. See Figs. 1-3 and 5-9. Therefore, the Mimura reference does not teach or suggest a stroke sensor provided at a side of the fuel cell box as required by dependent claim 3.

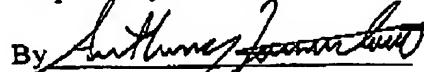
Accordingly, Applicants respectfully submit that the combination of the Ono reference, the Shimizu reference, and the Mimura reference do not teach or suggest a stroke sensor provided at a side of the fuel cell box, as required by claim 3. Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 3.

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

Applicants believe no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. NGW-010 from which the undersigned is authorized to draw.

Dated: December 21, 2005

Respectfully submitted,

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